

# STRUCTURED DC ELECTRIC FIELDS WITH AND WITHOUT ASSOCIATED PLASMA DENSITY GRADIENTS OBSERVED WITH THE C/NOFS SATELLITE

R. Pfaff<sup>1</sup>, D. Rowland<sup>1</sup>, J. Klenzing<sup>1</sup>, H. Freudenreich<sup>1</sup>, K. Bromund<sup>1</sup>, C. Liebrecht<sup>1</sup>, P. Roddy<sup>2</sup>, D. Hunton<sup>2</sup>

1: NASA/Goddard Space Flight Center, Greenbelt, MD, USA ([Robert.F.Pfaff@nasa.gov](mailto:Robert.F.Pfaff@nasa.gov))

2: Air Force Research Lab, Hanscom AFB, MA

DC electric field observations and associated plasma drifts gathered with the Vector Electric Field Investigation on the Air Force Communication/Navigation Outage Forecasting System (C/NOFS) satellite typically reveal considerable variation at large scales (~100's of km), in both daytime and nighttime cases, with enhanced structures usually confined to the nightside. Although such electric field structures are typically associated with plasma density depletions and structures, as observed by the Planar Langmuir Probe on C/NOFS, what is surprising is the number of cases in which large amplitude, structured DC electric fields are observed *without* a significant plasma density counterpart structure, including their appearance at times when the ambient plasma density appears relatively quiescent. We investigate the relationship of such structured DC electric fields and the ambient plasma density in the C/NOFS satellite measurements observed thus far, taking into account both plasma density depletions and enhancements. We investigate the mapping of the electric fields along magnetic field lines from distant altitudes and latitudes to locations where the density structures, which presumably formed the original seat of the electric fields, are no longer discernible in the observations. In some cases, the electric field structures and spectral characteristics appear to mimic those associated with equatorial spread-F processes, providing important clues to their origins. We examine altitude, seasonal, and longitudinal effects in an effort to establish the origin of such structured DC electric fields observed both with, and without, associated plasma density gradients.